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ABSTRACT

One of a series of curriculum guides prepared for the graphic communications occupations cluster, this guide identifies the essentials of the draftsman trade as recommended by the successful draftsman. An instructional program based upon the implementation of the guide is expected to prepare a student to adequately perform entry level tasks required of a draftsman or to enter a post-secondary technical or apprenticeship program in drafting where additional depth can be realized. Trade tasks or information are listed in chart form under the heading of safety, tools and equipment, general competencies, blueprint reading and planning, and operations and/or jobs. Space is provided on the charts to record for each item the date completed, teaching methods used, and teaching materials used. Also included are a list of teacher responsibilities, sources of occupational guidance information, recommended tests and references, and a chart depicting the total graphic communication occupational curriculum. A typical application for employment and a sample trade and industrial education injury report are appended. (HD)

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TRADE AND INDUSTRIAL EDUCATION

TRADE PREPARATORY TRAINING GUIDE

DRAFTING

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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DEFINITIONS USED IN THIS GUIDE

Major Occupational Group

A grouping of similar and related occupational area clusters. These groups include occupations that have been determined to be the most relevant and pertinent for inclusion in vocational education in Nebraska.

Occupational Area Clusters

These clusters are distinguishable in terms of similar work performed, materials used, products produced, and/or services rendered. They include a wide variety of common occupational skills and knowledge.

Occupation

The career employment engaged in by an individual for remuneration. This activity includes technical competencies and related technical information often referred to as one's vocation.

Technical Competency

The specific tasks required for a vocational trade and industrial graduate to perform successfully at the entry level in an occupational area. These technical competencies apply to the psychomotor domain and include elements which emphasize motor skills such as: operate a machine; measure; etc.

Related Technical Information

The information the entry level worker must know in order to make appropriate trade decisions which will allow him to adequately perform the tasks or technical competencies of his occupation. This information applies to the cognitive domain and includes elements which are intellectual outcomes such as: knowledge and understanding.

Related General Information

Information which is desirable and good for the tradesman to know but which is not necessary to do his work properly; information that is nice to know, such as the history and development of his trade.

Related Guidance Information

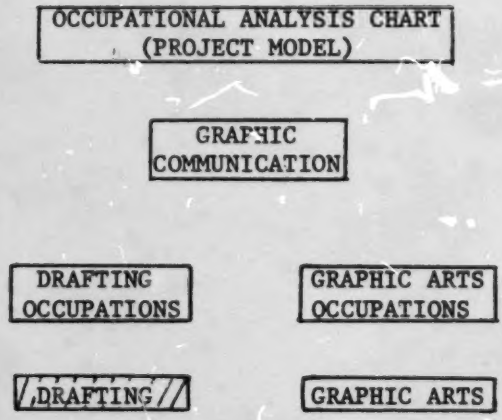
Information that helps the student choose, prepare for, secure, hold, and make progress in an occupation.

Entry Level

The technical competencies and related technical information deemed necessary by industry for obtaining and holding a job in a specific occupational area. This level of employment includes the technical competencies and related technical information that will be utilized by the employee within the first year of employment.

OCCUPATIONAL ANALYSIS CHART

The chart on this page shows Drafting as it relates to other occupations within the Graphic Communication cluster. Drafting is in the cluster which is a part of the major occupational group entitled Graphic Communication. This guide is concerned with Drafting only. Other guides have been prepared for each of the occupations found in this chart and are available through the Nebraska State Department of Education.



INTRODUCTION

This curriculum guide has been prepared with the help of competent craftsmen in the building trades. The funds that made this guide a reality were provided through a federal research grant in cooperation with the Nebraska State Board for Vocational Education and sponsored by the Nebraska Research Coordinating Unit.

Curriculum guides have been prepared for several trade and industrial occupational clusters from which high school teachers can develop appropriate occupational related experiences for their students. The major occupational groups, occupational area clusters, and occupations are shown in graphic form on pages of this guide.

Selection of trades within four major occupational groups have been made based on a three year survey by the Nebraska Research Coordinating Unit on needs of Nebraska business and industry. This study has identified the occupations with the greatest need for employees. A related set of curriculum guides have been prepared for these occupations.

Guidance Information

The U.S. Department of Labor has developed an extremely helpful book entitled, "Occupational Outlook Handbook." This annual publication provides a very complete description of the activities of the persons employed in the occupations represented in the Nebraska trade and industrial curriculum guides. Information concerning current and future opportunities is a major portion of this publication. Inexpensive reprints in booklet form that describe individual occupations are available through the Department of Labor. These booklets should be used by trade and industrial teachers and school guidance counselors for the most up-to-date guidance information about a particular occupation.

Number	Title	Price
1700-28	Technicians - Draftsman.....	.15
1700-29	Architects.....	.10
1700-109	Printing Occupations.....	.20

THE DRAFTING GUIDE

This guide uses the title Drafting as the most logical descriptive term for identifying a particular related group of workers. Identification of specific job titles within this group should be determinded by referring to the "Dictionary of Occupational Titles". The USOF classification system for coding instructional programs has assigned 017.00 to the instructional program, drafting.

The information within this guide identifies the essentials of the draftsman trade as recommended by the successful draftsman. An instructional program based upon the implementation of this guide will prepare a student to adequately perform entry level tasks required of a draftsman or to enter a post-secondary technical or apprenticeship program in drafting where additional depth can be realized.

The tasks and/or competencies identified within these covers are those agreed upon by a jury of reputable Nebraska draftsmen and architects. A separate group of persons directly employed within this trade in Nebraska have further verified these tasks and/or competencies. Jury members, tradesmen, and educators who contributed toward the development of content for this guide are listed in the front.

Course offerings in trade and industrial education in Nebraska are to be organized within two period blocks of time each day, five days a week. Time is to be set aside for classroom instruction directly related to manipulative laboratory instruction. The remainder of the student's school day is to be utilized for general education subjects.

USE OF THIS GUIDE

The use of curriculum guides for trade and industrial education in Nebraska secondary schools may vary greatly, depending upon the depth and breadth of each school district's vocational program. Large school districts, for example, may utilize one particular curriculum guide to develop a course in a trade area such as drafting. A small school district may, on the other hand, incorporate several curriculum guides to develop a course in the Graphic Communications.

The manipulative content identified in this guide is deemed necessary for inclusion in a course that is designed to prepare entry level drafting. While not all secondary school facilities in Nebraska are equipped to expose students to all of this content through hands-on experience, it is assumed that this content will through some media become related technical information. This will insure inclusion of all content and provide at least discussion level understanding.

This guide is written with the assumption and expectation that the related technical information necessary to perform technical competencies will be an integral part of instruction. Thus, occupational decisions that must be made by an entry level worker will be developed along with each related manipulative activity.

The drafting instructor who uses this guide is responsible for including the identified related technical information as well as the identified manipulative tasks. He is also responsible for the identification of competencies pertaining to general and guidance information, even though this information is not specifically identified for him.

Definitions for various terms used in this guide are presented in the front.

TEACHER RESPONSIBILITIES*

1. Use the American Vocational Association National Safety Council's "National Standards School Shop Safety Inspection Check List" for shop safety inspections. (Available from American Vocational Association, 1510 "H" Street, N.W., Washington, D.C. 20005)

2. Use safety check list to assure safe factors exist.

3. Require students to report ALL accidents to instructor.

4. Keep complete records of ALL accidents on file.

5. Report ALL accidents to the school administrator.

6. Develop safety consciousness in the students through teacher example--always doing things in the safe way.

7. Give shop demonstrations stressing safe use of machines.

8. Give shop demonstrations stressing safe use of hand tools.

9. Provide instruction on what to do in case of an accident.

10. Develop information sheets dealing with the safe use of specific machines.

11. Give demonstrations on the proper use and care of personal protective devices.

*These responsibilities are necessary for inclusion in all trade and industry programs in the State of Nebraska.

12. Develop information sheets dealing with the general safety rules for the trade.

13. Enclose all gears, moving belts, and other power transmission devices with permanent guards.

14. Prohibit students from operating machines when instructor is not present.

15. Prohibit the removal of guards and safety devices, even for a brief period, without the approval of the instructor.

16. Prohibit more than one operator from using a machine at one time.

17. Determine personal liability factors and liability coverage afforded through your school.

18. Provide for the bulk storage of flammable materials.

19. Mark the location of fire-fighting equipment.

20. Post instructions and inform students of building evacuation procedures.

21. Require the wearing of appropriate eye protection as specified by the State of Nebraska eye safety regulations.

22. Keep tools sharp, clean and in good working condition.

23. All shop personnel should be thoroughly familiar with the location of fire extinguishers and the type fire for which each extinguisher is designed.

DRAFTING
(Identified Trade Tasks or Information)

TRADE TASK OR INFORMATION	DATE COMPLETED	TEACHING METHODS USED	TEACHING MATERIALS USED
SAFETY			
Appl, general safety precautions on the job.			
TOOLS & EQUIPMENT			
Use and maintain:			
protractors & triangles			
french curves & templates			
erasers & erasing shields			
drafting pencils & ruling pens			
engineer & architects scales			

TRADE TASK OR INFORMATION	DATE COMPLETED	TEACHING METHODS USED	TEACHING MATERIALS USED
leroy type lettering instruments			
stick-on lettering			
T-squares, parallel rules, and drafting machines			
case instruments			
drafting boards & tables			
ellipsograph			
Select appropriate pencil(s) for a drawing.		14	
Select and utilize an appropriate eraser.			

GENERAL COMPETENCIES

Use mathematical principles in computations.

Understand and use basic geometry principles.

Understand and use basic trigonometry principles.

Understand and use basic algebra principles.

Understand and utilize descriptive geometric principles.

Select and utilize appropriate instruments for a specified drawing.

TRADE TASK OR INFORMATION	DATE COMPLETED	TEACHING METHODS USED	TEACHING MATERIALS USED
Read precision instruments to within a tolerance of ± .01 inch.			
Use drawing instruments.			
Specify size of samples of drafting media.			
Draw on various types of drafting media.			
Select, cut, and trace upon tracing paper or cloth.			
Make corrections and alterations on tracings.			
Change standard measurements into metric units.			

BLUEPRINT READING & PLANNING

Read, understand, and interpret engineering drawings.

The student will be able to: communicate with terminology common to drafting.

OPERATIONS AND/OR JOBS

Analyze and complete an assignment.

Organize work and materials.

Draw freehand.

Make a technically accurate sketch.

TRADE TASK OR INFORMATION	DATE COMPLETED	TEACHING METHODS USED	TEACHING MATERIALS USED
Make layout sketch			
Check a drawing and make necessary revisions.			
Incorporate symbols and conventions appropriate to specific area of drafting.			
Select and apply notations and symbols.			
Select and make application of standardized lines and symbols when dimensioning.			
Correlate dimensions on a drawing to insure function of a part.			
Select necessary dimensions.			

Dimension a drawing.

Understand and use orthographic projection.

Develop one, two, and three view drawings of solid shapes.

Draw necessary views and details of an object.

Isolate auxiliary view from multiview projection.

Use geometry to obtain axonometric projection from orthographic views.

Obtain oblique projection from orthographic views.

TRADE TASK OR INFORMATION	DATE COMPLETED	TEACHING METHODS USED	TEACHING MATERIALS USED
Analyze an object or picture to determine the views needed for a size and shape.			
Understand and use pictorial representation.			
The student will be able to: select appropriate technique to represent object.			
Select and arrange views of an object to show it clearly.			
Orient an object into its simplest position.			
Analyze sectional view situation and draw required view.			

Solve fabricating, inspecting and assembly problems.

Make developments of parts which require layout.

Draw an assembly.

Know various design concepts used currently in business and industry.

Understand and utilize elements involved in a design.

Develop production drawings.

Prepare architectural drawings.

TRADE TASK OR INFORMATION	DATE COMPLETED	TEACHING METHODS USED	TEACHING MATERIALS USED
Plan areas of a house.			
Draw completely finished floor plan.			
Design and draw a plan for adequate supporting footings and foundations.			
Prepare drawings for concrete and masonry construction.			
Prepare drawings for wood construction.			
Draw complete elevations.			
Make enlarged scale drawings of features requiring further clarification.			
Draw sectional views show-			

ing internal construction.

Draw a plot plan.

Reproduce drawings.

Complete specification forms.

Read, understand, and interpret the following classes or charts, graphs, and diagrams: those used for technical purposes.

Draw maps (plans, profiles, gradelines, cross section).

Draw plumbing and piping diagrams.

Draw ductwork diagrams.

Draw electrical diagrams.

Appendix A

One of the primary objectives of trade and industrial education is the successful placement of students completing course work in a specific occupation. The following sample application form is included in this guide with the recommendation that the preparation of such forms become a necessary activity for students in all trade and industrial education courses.

APPLICATION FOR EMPLOYMENT

PERSONAL INFORMATION

DATE _____ SOCIAL SECURITY NUMBER _____

NAME _____ (LAST / FIRST / MIDDLE)

PRESENT ADDRESS _____ (STREET / CITY / STATE)

PERMANENT ADDRESS _____ (STREET / CITY / STATE)

PHONE NO. _____ OWN HOME _____ RENT _____ BOARD _____

DATE OF BIRTH _____ HEIGHT _____ WEIGHT _____ COLOR OF HAIR _____ COLOR OF EYES _____

MARRIED _____ SINGLE _____ WIDOWED _____ DIVORCED _____ SEPARATED _____

NUMBER OF CHILDREN _____ DEPENDENTS OTHER THAN WIFE OR CHILDREN _____ CITIZEN OF U. S. A. YES ○ NO ○

IF RELATED TO ANYONE IN OUR EMPLOY, STATE NAME AND DEPARTMENT _____ REFERRED BY _____

EMPLOYMENT DESIRED

POSITION _____ DATE YOU CAN START _____ SALARY DESIRED _____

ARE YOU EMPLOYED NOW? _____ IF SO MAY WE INQUIRE OF YOUR PRESENT EMPLOYER _____

EVER APPLIED TO THIS COMPANY BEFORE? _____ WHERE _____ WHEN _____

EDUCATION	NAME AND LOCATION OF SCHOOL	YEARS ATTENDED	DATE GRADUATED	SUBJECTS STUDIED
GRAMMAR SCHOOL				
HIGH SCHOOL				
COLLEGE				
TRADE, BUSINESS OR CORRESPONDENCE SCHOOL				

SUBJECTS OF SPECIAL STUDY OR RESEARCH WORK _____

WHAT FOREIGN LANGUAGES DO YOU SPEAK FLUENTLY? _____ READ _____ WRITE _____

U. S. MILITARY OR NAVAL SERVICE _____ RANK _____ PRESENT MEMBERSHIP IN NATIONAL GUARD OR RESERVES _____

CONTINUED ON OTHER SIDE

FORMER EMPLOYERS (LIST BELOW LAST FOUR EMPLOYERS, STARTING WITH LAST ONE FIRST.)

DATE MONTH AND YEAR	NAME AND ADDRESS OF EMPLOYER	SALARY	POSITION	REASON FOR LEAVING
FROM				
TO				
FROM				
TO				
FROM				
TO				
FROM				
TO				

REFERENCES: GIVE BELOW THE NAMES OF THREE PERSONS NOT RELATED TO YOU, WHOM YOU HAVE KNOWN AT LEAST ONE YEAR.

	NAME	ADDRESS	BUSINESS	YEARS ACQUAINTED
1				
2				
3				

PHYSICAL RECORD:

LIST ANY PHYSICAL DEFECTS

ARE YOU EVER INJURED? GIVE DETAILS

HAVE YOU ANY DEFECTS IN HEARING? IN VISION? IN SPEECH?

IN CASE OF EMERGENCY NOTIFY

NAME ADDRESS PHONE NO.

I AUTHORIZE INVESTIGATION OF ALL STATEMENTS CONTAINED IN THIS APPLICATION. I UNDERSTAND THAT MISREPRESENTATION OR OMISSION OF FACTS CALLED FOR IS CAUSE FOR DISMISSAL. FURTHER, I UNDERSTAND AND AGREE THAT MY EMPLOYMENT IS FOR NO DEFINITE PERIOD AND MAY, REGARDLESS OF THE DATE OF PAYMENT OF MY WAGES AND SALARY, BE TERMINATED AT ANY TIME WITHOUT ANY PREVIOUS NOTICE.

DATE SIGNATURE

DO NOT WRITE BELOW THIS LINE

INTERVIEWED BY DATE

REMARKS:

NEATNESS		CHARACTER	
PERSONALITY		ABILITY	

HIRED FOR DEPT. POSITION WHEN REPORT SALARY WAGES

APPROVED: 1. EMPLOYMENT MANAGER 2. DEPT. HEAD 3. GENERAL MANAGER

Appendix E

One of the most important parts of any trade and industrial education course is a safety program. The following form is recommended for use in courses of this type.

SAMPLE
TRADE AND INDUSTRIAL EDUCATION
INJURY REPORT* **

Student injured _____ Date _____

Shop in which accident occurred _____ Time _____

Instructor in charge _____

Nature of injury _____

_____

First aid administered _____

_____ By whom? _____

Cause of injury _____

_____

Could injury have been prevented? ____ How? _____

_____

Action taken or recommendations made to prevent recurrence _____

Remarks: _____

_____

_____

Signed _____
(Person making report)

Witnesses: _____

Names _____
and
Addresses _____

*Complete in Duplicate
**File one copy in office

RECOMMENDED TEXTS AND REFERENCES

DRAFTING

Bibliography

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